

# SPINACH

## EARLY AND LATE

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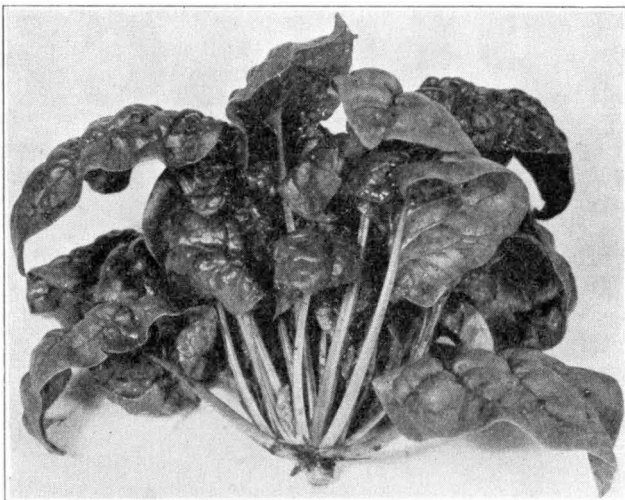


FIG. 1.—A WELL-DEVELOPED SPINACH PLANT HARVESTED IN PRIME CONDITION

The root has been severed about half an inch below the crown and the plant carefully handled to prevent bruising or breaking.

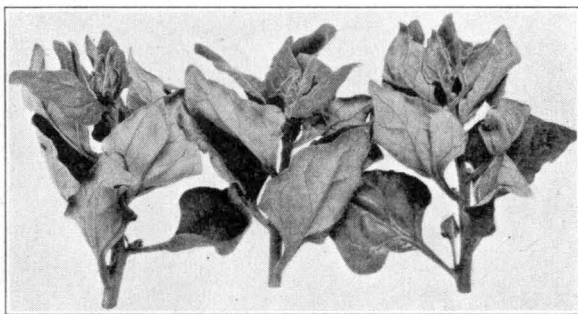


FIG. 2.—EDIBLE PORTION OF NEW ZEALAND SPINACH

In harvesting New Zealand spinach, only the tender young tips of the growing shoots are taken.

# Spinach Early and Late

By J. W. LLOYD, Chief in Olericulture

**S**PINACH has long been the most important plant cultivated for "greens" in this country, and its use has greatly increased during the past few years.<sup>1</sup> Much of the increase in the popularity of spinach is doubtless due to wider appreciation of its healthfulness as a food. Spinach is especially rich in three important minerals that are essential to normal growth and development of the human body; namely iron, calcium, and phosphorus. It is also a very good source of vitamins A, B, and C.

While the home-grown supply of spinach in the northern states at present is usually restricted to the spring crop and is available for a period of only three or four weeks, spinach is shipped in from other regions, notably Texas and Virginia, during the late fall, winter, and early spring, and the canned product from California and Maryland is depended on to supplement the fresh supply whenever needed. Fresh spinach is scarce during the summer months and the crop is not generally grown in the fall in the northern states. With facilities for irrigation it is possible to grow the fall crop to perfection, and by the substitution of New Zealand spinach for the regular type, the product can be made available thruout the summer months. There is opportunity for home gardeners and market gardeners in the northern states to have a supply of spinach of one type or the other from May until October or early November.

## Land Prepared in Fall for Early Spring Crop

Spinach is essentially a cool-season plant. In order that the spring crop may complete its development before the weather becomes hot, it must be planted early. While the spring crop of spinach is ordinarily planted about the same time as onions and early peas, the season of harvest may be slightly advanced by extremely early planting, that is, three or four weeks ahead of the normal planting season.

Early spring planting will be facilitated by special preparation given the land in the fall. A well-drained area should be selected, should be given a liberal application of stable manure, and then plowed in narrow lands 12 to 16 feet wide, with high backfurrows and deep dead furrows. Each land or ridge is then harrowed and smoothed down so that the slope is uniform from the center to the edge, with no depressions to hold water. The ends of the dead furrows should open into a cross ditch to complete the surface drainage.

On land prepared in this way a planting may often be made a month before most fields in the region are dry enough to work. Sometimes, with the right combination of sunshine and wind, the frost goes out of

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<sup>1</sup>The acreage devoted to this crop for consumption in the fresh state and for canning increased from 23,760 acres in 1922 to 72,570 acres in 1929, while the carlot shipments increased from 4,914 carloads in 1922 to 10,340 in 1929.

the top two inches of soil on the ridges and leaves a nice friable seed bed while the ground is frozen solid below. If this condition occurs in central Illinois any time after February 20, an early crop of spinach may be started. If the land has been thoroly smoothed in the fall and is not too heavy a type, the sowing may be done with a seed drill without any further preparation of the soil. Very often, on account of subsequent rain or freezing, the soil remains in the right condition for planting for only a few hours; hence prompt action is necessary.

If the frost goes out of the soil with a rain, there is no opportunity for planting in a dry layer above the frost, but the rapid drainage afforded by the method of soil preparation described makes it possible to work up a seed bed in the usual manner much earlier than could be done on land not so prepared.

### **Complete Commercial Fertilizers Beneficial**

When spinach is seeded early on ridges prepared in the fall, usually no time is taken to apply fertilizers before seeding. However, top-dressings of sodium nitrate, applied to the growing crop two or three times at intervals of two weeks, may often be used to advantage. From 100 to 150 pounds to the acre may be used at each application. The nitrate may be put on by hand or with a side-dresser drill. Care should be taken to avoid letting the nitrate come in contact with the foliage of the plants.

For plantings made at the usual time in spring, it is customary to apply manure in the fall and plow it under. Experiments in the fertilizing of spinach on the dark-colored upland soil at Urbana indicate that this crop responds particularly well to applications of phosphorus and potash used as supplements to manure. In the absence of manure exceptionally large yields were obtained by using a complete commercial fertilizer containing 6 percent nitrogen, 12 percent phosphoric acid, and 8 percent potash, at the rate of 1,200 pounds an acre, on land that had been well supplied with organic matter thru the use of cover crops and limed to correct any acidity. In experimental work in Cook county also, spinach produced exceptionally good yields without manure on plots treated with a complete commercial fertilizer at the rate of 1,000 pounds an acre. In this case the fertilizer contained 4 percent nitrogen, 8 percent phosphoric acid, and 6 percent potash, a proportion of elements not much different from that in the fertilizer used at Urbana.

In the experimental work, both at Urbana and in Cook county, the fertilizer was applied broadcast just before planting and was thoroly mixed with the surface soil by disking and harrowing in the preparation of the seed bed.

### **Insuring a Good Stand of Spinach**

The spring crop of spinach is almost invariably sown in drills; the customary distance between the rows is 12 inches. In order to insure a good stand of spinach, sowing should be at the rate of about 25 seeds to the foot of row. Sown at this rate, from 25 to 30 pounds of seed are required to plant an acre. The depth of planting should be about  $\frac{3}{4}$  inch. The regular time for sowing the spring crop in central Illinois is late March, or the same time that farmers are sowing oats.

The fall crop in central Illinois is sown during the last few days of August or the first of September. If sown earlier, the seedlings encounter too much hot weather; if sown later, there is not sufficient time for the crop to develop before the severe freezes likely to occur in early November. Sowing should be slightly earlier in the northern part of the state, and slightly later in the southern part. If the fall crop is sown in drills, the distance of planting is the same as for the spring crop. Sometimes, however, especially in the extreme southern part of the state, the fall crop is sown broadcast and is either harvested in the late fall or allowed to remain in the field until it has resumed growth early in the spring.

To make sure of obtaining a stand of fall-sown spinach and sufficiently rapid growth to develop a marketable product before freezing weather, it is highly desirable to be equipped with facilities for artificial watering. Then in case rains do not supply sufficient moisture, irrigation may be applied as needed.

The fall crop of spinach is grown by market gardeners on land that has already produced one or two crops of vegetables the same season, and is thus clear gain so far as the use of land is concerned.

### **Plant Blight-Resistant Variety in Fall**

The chief obstacle in growing fall spinach, aside from lack of moisture where irrigation cannot be provided, is the disease known as yellows, or blight. Loss from this disease can be prevented most effectively by planting a blight-resistant variety of seed. The variety known as Virginia Savoy is blight-resistant and meets the requirements for the fall crop.

### **Cultivation With Wheel Hoes**

When spinach has been sown in drills, the growing crop is ordinarily cultivated by means of wheel hoes in the same way as onions, beets, and carrots, except that the season of tillage is shorter. Spinach plants usually do not need to be thinned since many of the seeds fail to grow and a large development of the individual plant is not required to produce a marketable product. Furthermore, if land fairly free from weed seeds has been selected, no hand weeding will be necessary. The spinach plants grow rapidly and can compete successfully with most species of weeds that might gain a foothold in the row during the short time the spinach occupies the land.

### **Begin Harvesting Early**

Under favorable growing conditions spring-sown spinach will be large enough for beginning the harvest about eight weeks from the time of planting. For local market or the home table, harvesting should be started just as soon as any of the plants are large enough for use. By beginning early a longer harvesting season is secured and, in addition, prices in the local market are likely to be highest at the very beginning of the season. Any sacrifice in yield due to early cutting is usually more than offset by the better price obtained at that time.

At the beginning of the harvest, when only the largest plants are to be taken, it is necessary to cut the individual plants with a sharp knife. The root of each plant to be harvested is severed about half an inch below the crown, and the plants are placed in a basket as they are cut. When nearly all the plants are large enough for market, a common method of harvesting spinach planted in rows is to cut the plants off just below the surface of the ground by means of a wheel hoe equipped with hoe blades or with an onion harvester attachment. The plants are then picked up and put into bushel baskets. Spinach that has been sown broadcast is almost invariably harvested with a knife. Since spinach plants are very brittle when full of moisture early in the day, harvesting should be done in the afternoon when the plants are slightly wilted in order to avoid breaking the stems or leaves.

### Packing Spinach for Market

Various packages are used for marketing spinach, but probably the most popular at the present time is the bushel basket. As usually packed, such a container holds 12 pounds of spinach, net. For local market the



FIG. 3.—A BUSHEL BASKET OF SPINACH READY FOR LOCAL MARKET

Unless packed for shipping, the baskets of spinach are handled without covers.

baskets of spinach are handled without covers; for shipment they are always covered. Furthermore, for shipment, crushed ice is placed in the basket with the spinach. Six to 14 pounds of ice is used in each basket, depending on conditions. It is best to place half the ice in a layer at the middle of the basket and the other half near the top.

The advisability of washing spinach before marketing is a disputed question. If dirty when harvested, it looks better when packed if it has been washed; and when marketed locally washing is considered good practice. However, in spite of care in handling, the spinach stems and



leaves become more or less bruised or broken during the washing process, and decay is likely to start in the injured tissue and cause serious damage to the product during shipment and when exposed on the market following shipment.<sup>1</sup> For this reason growers are advised not to wash spinach before shipment unless it is very dirty. In case washing seems necessary, the spinach should be in a slightly wilted condition when it is handled, and every care should be taken to prevent bruising or breaking. The washing is usually done in large tanks thru which fresh water is kept continually flowing.

Spinach is shipped in refrigerator cars with the bunkers well filled with ice in addition to the ice in the baskets. The baskets are stacked either five or six high and must all be placed right side up to get the full benefit of the refrigerating effect of the ice in the tops of the baskets.

In addition to the ice in the baskets and in the bunkers a layer of ice is commonly placed on top of the load.

Cars for shipping spinach should always be equipped with floor-racks to provide better circulation of air thru the load.

### New Zealand Spinach for Summer Use

During the summer months, when fresh spinach of the regular type is not available, New Zealand spinach affords a very acceptable substitute for use on the home table or for sale in local markets. This crop may be grown from seed sown directly in the open ground or may be started in a greenhouse or hotbed. If sown in the open, the seed should be planted quite early, that is, about the first of April. The seed coats are hard and germination is slow, requiring an abundance of moisture. It is well to mark the rows with radish seeds, so that cultivation may begin before the spinach seedlings appear. Since New Zealand spinach is a broad, spreading plant, the rows should be at least 4 feet apart. The plants may be thinned to one foot apart in the row.

A slightly earlier crop may be obtained by starting the plants under glass. In this case the seed is sown in greenhouse flats, and the seedlings are pricked out into 2-inch pots while they are still very small. The pots are plunged in the bench of a cool greenhouse or the soil of a mild hotbed. The plants should be ready for setting in the field in late April or early May. Care should be taken to prevent the plants from being frosted just after they are put out, for they are quite tender when first transplanted. The distances between rows and between plants in the row are the same as for the crop planted directly in the field.

*Sodium Nitrate Stimulates Growth.* New Zealand spinach should be given good cultivation until the plants have nearly covered the ground between the rows. Nitrate of soda applied to the plants about once a month will help to keep them growing luxuriantly. In dry weather the spinach is greatly benefited by artificial watering. If facilities are available for overhead irrigation, the nitrate can be scattered broadcast over the plants and the irrigation water immediately turned on. This results in rapid solution of the nitrate, which is washed off the leaves before any damage is done to the foliage.

<sup>1</sup>U.S. Dept. Agr. Farmers' Bul. 1189, "Handling Spinach for Long-Distance Shipment."

*Tips of Shoots Are Harvested.* Unlike ordinary spinach, in which the entire plant is taken at the harvest and the harvesting period lasts for only three or four weeks at most, the plants of New Zealand spinach are not destroyed at the harvest but continue to furnish an edible product thru a period of at least four months, or from late June until the plants are killed by heavy frosts in late October or early November.



FIG. 4.—A ROW OF NEW ZEALAND SPINACH

This plant makes a wide, spreading growth. A single row will cover a space 4 or 5 feet wide.

The New Zealand spinach plant is much branched. In harvesting the product, only the tender, growing tips of the branches are removed. These are plucked at a point about four inches from the end. The entire tip, including stem and leaves, is edible; but if much more than the 4-inch terminal portion of the shoot is taken, the lower end is likely to be tough. Harvesting the tips encourages the development of new shoots from the nodes of the stem just below the severed portion. The process of harvesting and the development of new shoots continue all thru the summer and fall until heavy frosts kill the plants. Under normal conditions, the same plant furnishes a picking about once a week. By starting at one end of the row or one side of the plantation and picking a certain portion of the area each day, New Zealand spinach may be harvested continuously.

#### Spinach From May to October

*By a combination of spring and fall crops of the regular type of spinach and a planting of New Zealand spinach for use during the summer, it is possible to maintain a continuous supply of these healthful greens for the home table or local market in central and northern Illinois from about the middle of May until late October. Farther south the harvesting season is even longer.*